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OF THE

STRAITS

AND

FEDERATED MALAY STATES.

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THE EUCALYPTUS.

From time to time a considerable number of letters appear in the local papers commenting on the desirability of planting varieties of the Eucalyptus as suitable roadside trees, and also, on account of their supposed value in purifying localities where severe fevers are prevalent.

We have received many letters asking for advice on the same subjects, and in order to give a general answer to all such correspondents, I shall endeavour to outline the success which has attended the efforts of this Department, to introduce any of the Eucalyptus family.

A Few General Characteristics of Eucalypts.

As is probably well known, the Eucalyptus or Eucalypts are natives of Australia and a few of the adjacent Islands. The genus is a large one, comprising over 150 species. Many of the species are trees varying in height—some of them being amongst the largest in the World, while others are small shrubs which thrive in desert and alpine regions. A number of the species are vigorous growers. The Blue Gum (*Eucalyptus globulus*) is one of the fastest growing of the genus.

From the middle of the last century, the Eucalypts have been distributed all over the World with various degrees of success. As is only to be expected, the most marked success has been attained in countries having a somewhat similar climate to Australia. Eucalypts have been successfully established in Algeria, South Africa, on the Nilghiri and Palui Hills and in North and South America. It is interesting to note that during the last few years, the chief product of the Eucalypts *i.e.*, Eucalyptus Oil has largely been produced in California.

In Australia, the Eucalypts grow in a great variety of soils and climates, varying from deserts or dry mountainous regions to low swamps and moist mountainous ones. It would therefore seem possible to select species which would be suitable to a great variety of situations. All the larger arboreal forms delight in a warm climate but other conditions must also exist to enable them to become successfully established.

Prof. Charles Naudin in his memoir on the genus says:—"The first condition of success in the culture of Eucalypts is a climate appropriate to their nature; that is to say, for a great majority of the species, warm summers, a *moderate amount of rain, a certain amount of atmospheric dryness,* plenty of sunlight and very temperate winters."

I have placed in italics the portion of the quotation from Prof. Naudin's memoir which particularly applies to the Straits and Federated Malay States. It cannot be said that with an average annual rainfall of 96 inches we enjoy a *moderate supply* of rain, nor for the same reason can we lay claim to the certain amount of *atmospheric dryness* in our climate necessary to their successful culture.

Most Eucalypts are benefited by occasional heavy rainfalls which thoroughly saturate the soil, as indeed most arboreal plants are, but frequent heavy rains and the subsequent very humid atmosphere are not conducive to their healthful growth. As has already been mentioned, a few of the species grow in swampy, humid regions, but the majority, though able to absorb large quantities of water by means of their roots, prefer for their aboveground parts a dry atmosphere, at least for a considerable portion of the year.

In Australia, the Eucalypts are generally found forming large forests and indeed many of them do not form very desirable shade trees when planted for that purpose.

As I shall endeavour to show, the raising of Eucalypts is attended with no little difficulty and in view of the fact that the soils and conditions our present roadside trees are subject to, would destroy any chance the Eucalypts might have (provided climatic conditions were suitable) it would seem that we must be content for the present at any rate, with the large and excellent variety of other trees that are available.

It is generally believed that Eucalypts have a most benefiting influence on the climate of those regions in which they are planted to any large extent. There seems to be a great diversity of opinion on this point, however, as the following quotations will show.

The American Consul at Florence, in 1894, writes in his Consular Reports, "It is this latter quality (the property of distributing a balsamic atmosphere) which has brought the Eucalyptus into such prominence in Italy, and has been the cause, not only of the planting of thousands of trees by private individuals and public corporations, but of its receiving the indorsement of the Italian Government as well."

It seems strange that the American Consul at Rome, should take an altogether different view of the subject. In his Consular Report for 1894, he says: "In Italy, although the newspapers had persuaded everyone that the farm of the Tres Fontane, near Rome, had become healthful by means of the Eucalypti, it proved a disagreeable surprise to learn of a sudden outbreak of malaria in 1882 that caused much sickness among the farm hands, while the rest of the Campagna remained perfectly healthy . . . . Dr. Montechiare, a practising physician of Rome, who for many years was physician to the penal colony at Tres Fontane, tells me that his experience justifies him in declaring that no beneficial results against malaria has been derived from the planting of the Eucalypts."

Mr. A. J. McClatchie, M.A., in a Bulletin published by the Bureau of Forestry of the United States Department of Agriculture gives a few reasons why such a property has been attributed to the Eucalypts and though it does not decide the question one way or the other it may be worth while to repeat them here. "It is probable that a great part of the change in the sanitary condition of those places, said to have been benefited by Eucalypts, has been due to other causes, such as the making of drainage ditches, etc., and this will partially account for the conflicting opinions on the subject. When, however, the nature and habit of the trees are considered, it is entirely reasonable to believe that, to a certain extent, they beneficially affect the atmosphere in the region of their growth. The grounds for this belief are: First, their great capacity for absorbing moisture from the soil, and thus reducing the quantity of stagnant water in the ground at their roots; second, their corresponding power of giving off fresh from their foliage, the water thus taken up by their roots; third, exhalation from their leaves and other parts, of volatile oils, which affect the climate not only directly but by changing the oxygen of the atmosphere to ozone; fourth, the purification of germ-infested matter by the foliage dropped upon the ground or in pools of standing water. From the combined action of these four characteristics it seems reasonable to believe that the trees would be beneficial to many climates."

Mr. Ridley did not believe for an instant that, in so far as the Straits and Federated Malay States were concerned, the Eucalypts would influence climatic conditions in any way whatever. We may take it, however, that, unless the Eucalypts thrive exceedingly well and are planted in the form of large forests, no benefits can possibly be derived therefrom. It is not to be expected that a few Eucalyptus trees planted in a swamp, would change the whole climatic conditions of that swamp just as a few nodules on a leguminous plant cannot be expected to have the effect of enriching a large area in nitrogen, to any appreciable extent.

Eucalypts in the Botanic Gardens.

The earliest record of the introduction of Eucalypts to the Botanic Gardens, Singapore was on January 4th, 1876, or practically

12 months after the founding of the Gardens. They were presented by Dr. Schomburg of Adelaide and consisted of packets of seed of the following varieties:—*E. alpina*; *E. amygdalina*; *E. calophylla*; *E. coriacea*; *E. empetrifolia*; *E. ficifolia*; *E. globulus*; *E. Lehmanni*; *E. marginata*; *E. oblique*; *E. piperita*; *E. unifera* and an unnamed species from Tasmania.

Seed of *E. tereticornis* were received in June, 1876, from the Botanic Gardens of Rockhampton and at the same time plants were received of *E. eugenoides* from the same Gardens. In addition to the already mentioned varieties, the following were received from time to time:—*E. citriodora, goniocalyx, rostrata, siderophloia* and *viminalis* from the Gardens, Brisbane in July, 1877. *E. Baileyii* from the Queensland Arboricultural Society in 1878; plants of *E. longifolia and cornuta* in 1878, from the Botanic Gardens, Brisbane; *E. callosa, haematostoma, pilularis and paniculata,* from the Botanic Gardens, Adelaide, in 1879 and so on, practically every year, in ever increasing variety down to the present year. (I have enumerated a few of the many varieties received in order that there may be no doubt about all or nearly all the varieties, which had any likelihood of success in this climate, being tried.)

It would seem quite permissable therefore, to imagine that there ought to be a considerable number of large trees in the Gardens at the present time, but such is indeed far from being the case. Out of the many hundreds of packets of seed which must have been presented to the Gardens during their existence, only one specimen of any dimension is to be found in the Upper Garden *i.e.*, E. intermedia? was planted on rising ground adjacent to the bandstand. It is now a tree of about sixty feet tall and has a circumference of six feet at a distance of three feet from the ground.

The situation must be described as being dry and favourable to the growth of plants requiring such an one (I have been unable to trace "intermedia" in any of the treatises on the genus but as this tree has lately flowered, specimens have been prepared in order that the correct determination may be arrived at).

In the Economic Garden, eleven trees are to be found. Seven of those were planted adjacent to Bukit Timah Road. It is probably well known that this land is frequently covered with water and at no time is the water deeper than about eighteen inches from the surface. The trees do not look healthy and all that can be said of them is that they have merely existed. They are about forty feet in height unbranched and with extremely few leaves on the crowns.

The other four were planted adjacent to the Subordinates Quarters *i.e.* on rising ground. They are practically in a similar state to the other seven and all are slowly dying. No particulars can be obtained as to when those 11 trees were planted nor have I been able to identify them (specimens have also been prepared for identification).

None of those twelve trees can be said to be suitable shade trees as they do not possess one of the essential requirements of a first class shade tree *i.e.*, a good spreading head of branches.

Some six or seven years ago, Mr. Ridley selected the driest part of the Garden for Australian plants; Callistemons, Grevilleas, Acacias and three Eucalypts were planted therein. The present condition of those Eucalypts is as follows;— E. citriodora is now about fifteen feet high, of slender growth, the lower branches continually dying off and altogether not in a very healthful condition; E. gomphocephala is now about eight feet high and in a similar condition to last; E. robusta on the other hand, as the name implies, is of more robust growth. The specimen is now about eighteen feet high and in this case, the lower branches remain on the plant for a much longer period than on any of the other two. It is the most healthy specimen of the three and it will be interesting to note its future growth.

It will be seen therefore, that little or no success has resulted in the endeavour to establish Eucalypts in Singapore.

Why?

Eucalypts are only and can only be propagated from seed, and it is to the inability of the seedling to withstand our humid climate, that the failure of establishing Eucalypts must be attributed. I have personally sown the seeds and attended them in every way possible and after the seedlings have produced their second leaf they suddenly die, damping off at the neck. This happened to all varieties with but one exception *i.e.*, E. citriodora. We have now seven or eight fairly healthy plants in small pots and it is intended to try those at a later date in a variety of situations and note results.

In support of my experience with seed and seedlings I may quote from one of our correspondents. He says:—"I may say that the Eucalyptus has so far shewn no sign of being a success. The seeds were bedded out in the same manner as Tobacco seeds—in "tempat bibits". Only one variety (*E. hemiphloia*) germinated at all in numbers, but these, with a doubtful one here and there in other beds, seemed to be eaten away rapidly and completely. No broken leaves were seen—they simply vanished!"

It may not be amiss to repeat what the late Mr. Murton said in his Report of Botanic Gardens in 1878. He said:—

I have been very successful during the first year in raising the various species of Eucalyptus, which hitherto have proved very difficult to raise from seed in this climate. A number of plants of Eucalypts as well as other plants have been supplied to the Public Works Department for planting in the reservoir grounds near Government Hill and also for the reservoir grounds at Thompson Road.

In his Report for 1878, he said:—

Eucalypts—My anticipation about the Eucalypti when I wrote my last Annual Report, have not been verified; for, although they germinated freely enough, the majority of these species die as they get a few inches high.

E. globulus appears to be the worst species for this climate, *E. citriodora*, *E. amygdalinus*, *E. goniocalyx*, *E. pilularis* and *E. calophylla* do best. I attach very little importance, however, to this, as the belief in their prophylactic virtues is now considerably weakened and they are quite unsuited, owing to their straggling, ragged appearance, for garden ornaments.

In his report for 1880, he said:—

When sown *in situ* they seem to thrive fairly well in Singapore' but do not appear to stand transplanting. *E. siderophloia*, *E. Baileyii* and one or two other species are growing well in the nursery. (none of those are now to be found).

One must perforce come to the conclusion that the Eucalypts (with rare exceptions) are not suited to our climate, and taken for granted that all the useful and healthful effects which are attributed to the Eucalypts, in so far as influence on climate is concerned, be perfectly true, I think it has been proved conclusively that the tree will not grow in sufficient quantities to warrant further trials.

J. W. ANDERSON.

NOTE.

Since writing the above note on the Eucalypts, I have been able to obtain the correct determinations of the eleven large Eucalypts mentioned therein. Specimens were sent to Mr. Maiden, Director of the Botanic Gardens, Sydney and Government Botanist, who most kindly identified them for me. The one adjacent to the bandstand and under the name of *intermedia* has been identified as E. corymbosa, Sm., while those in the Economic Gardens are probable specimens of E. terminalis, F. & M., but owing to incomplete specimens being sent (no seed being available), Mr. Maiden was unable to say for certain as to whether this was correct or not.

A SACCHARINE CONSTITUENT OF PARA RUBBER.

In October, 1909, two small specimens of smoked Para rubber from the Botanic Gardens at Singapore, representing a consignment offered for sale in the United Kingdom, were forwarded for examination to the Imperial Institue by brokers in London, who stated that the rubber had been prepared experimentally by the Brazilian method

of smoking. On examination in the usual manner, it was found that the rubber contained a very high percentage of "resin" (*i.e.*, matter soluble in acetone), amounting to 5.2 per cent on the dry material. This proportion of resin is very much higher than is usually present in Para rubber from the East, but owing to the smallness of the samples supplied to the Imperial Institute it was not possible to investigate the matter in detail. Subsequently, however, a large specimen of smoked rubber, carefully prepared from the latex of a single tree by the same process as that employed for the earlier specimens, was forwarded for further examination to the Imperial Institute by the Director of the Botanic Gardens at Singapore.

The specimen consisted of a spindle-shaped piece of smoked rubber, weighing 6 lbs., which was almost black externally but whitish within when cut. The rubber was rather moist, and a quantity of brown viscous liquid was present between the concentric layers.

An analysis of the rubber gave the following results:—

	Rubber as received.	Composition of dry rubber.
	per cent.	*per cent.*
Moisture	7.4	—
Caoutchouc	84.6	91.4
"Resin"	4.4	4.8
Proteid	2.9	3.1
Ash	0.7	0.7

The percentage of "resin" present in the dry rubber was a little lower than that found in the previous samples (4.8 per cent. compared with 5.2 per cent.), but was still very much higher than the amount usually present in plantation rubber from the East.

An examination was made of the portion of the rubber dissolved by hot acetone, and it was found that a large quantity of a solid crystalline substance, which was soluble in hot water, was included with the resin. The substance amounted to no less than 2.7 per cent. of the dry rubber, so that the true figure for the percentage of resin in dry rubber was only 2.1 per cent. instead of 4.8 per cent.

The crystalline substance was submitted to a detailed examination and proved to be a carbohydrate, which was identified as *lævo*-methylinosite. The presence of this substance in the aqueous portion of the latex of *Hevea brasiliensis* remaining after the coagulation of the rubber has been previously recorded by de Jong, and closely allied carbohydrates are known to occur in other latices. The presence of such a large amount of the *l*-methylinosite in this specimen of Para rubber is no doubt to be attributed to the method of preparation employed, whereby the whole of the solid constituents of the latex remain in the rubber, whereas in the usual method of coagulation adopted in the East, the rubber separates from the aqueous portion of the latex, which retains the soluble constituents in solution.

In order to complete the investigation, a supply of the latex of the same tree from which the rubber had been prepared was obtained from Singapore. The aqueous portion of this latex, after separating the rubber, was found to contain a quantity of the *l*-methylinosite, amounting to 0.46 per cent. of the total latex. The presence of this carbohydrate has also been proved in fine hard Para rubber from South America.

The results of this investigation are of considerable practical interest as showing that in the analysis of rubber prepared by the Brazilian method (or by any method which leads to the inclusion in the rubber of all the solid constituents of the latex) it will be necessary to take into account the possibility of other substances besides resin being extracted from the rubber on treatment with hot acetone.

A preliminary note on the results of this investigation has been communicated to the Chemical Society of London, by Dr. S. S. Pickles and Mr. B. W. Whitefeild, of the Scientific and Technical Department of the Imperial Institute.—(*Bulletin of the Imperial Institute, April, 1912.*)

PARA RUBBER IN ST. LUCIA.

Ten thousand seeds of Para Rubber *(Hevea brasiliensis)* were obtained from Ceylon and arrived in October. Some of them were distributed to purchasers and the remainder were sown at the Experimental Station nursery. Only 10 per cent. of the whole consignment germinated. At the station 780 plants were raised and some of the number will be reserved for planting in a plot. About 600 will be available for distribution.

Para rubber planting in St. Lucia is at present only on experimental lines, but the trees planted in 1908-09 appear to be making very satisfactory growth, and some interest in the cultivation is developing. A more extended trial is desirable, to test the suitability of different soils and localities for the successful cultivation of this tree.

Experiments have been carried out to test the hardiness of Para rubber plants for distribution in the Island, when they are packed, with the view of reducing the bulk in and therefore the cost of transporting parcels of them, at the same time ensuring that they shall arrive at the various estates in sound condition. The trial was carried out as follows: Twelve plants were lifted from the seed beds, the tops cut back leaving the plants a little over a foot in length and all the leaves were removed. The soil was then shaken from the roots leaving them quite bare. The plants were then divided into two bundles and wrapped up in banana trash, which had previously been thoroughly soaked in water; each bundle containing six plants. One bundle was placed in a dry close potting shed, the temperature of which often reached 95° F., and the other bundle was placed in the Office.

After eight days the plants were examined and found to be in a fresh and healthy condition. The plants placed in the potting shed had been badly gnawed by rats, but were otherwise healthy. The whole twelve were then planted out in the ordinary way, and no special attention or treatment given to them. The plants commenced to grow readily with one exception, and this was the plant that had almost been denuded of bark by rats.

The results are very satisfactory, inasmuch as they prove that Para plants can be sent to any estate in the Island, packed in the way described, without fear of permanent injury, or loss, provided that they receive proper attention upon arrival at their destination. *(Report on the Botanic Station and Experiment Plots, St. Lucia, 1910-11)*

RUBBER IN THE SEYCHELLES.

The following extracts are taken from the Report of the Curator (M. Dupont) on the Botanic Station, Seychelles. for 1911.

The total number of treess now in Seychelles is estimated at 70,585, of which 4,511 have reached tappable size. The tapping experiments on Hevea trees were continued. Several kinds of tapping knives were tried, but it was found that successful tapping depended more on the skill of the operator than on the instrument employed. The Barrydo knife proved a less dangerous implement in the hands of inexperienced tappers than either the Bowman—Northway or the Eagle knife, both of which produce deep wounds. The "half-herring-bone" method of tapping was used in most cases on the "opposite quarters" system, *i. e.*, one-quarter of the surface of the bark of the tree is tapped during one year, and it takes four years to tap the whole tree before beginning on renewed bark. The full spiral system was adopted in one set of experiments where trees were overcrowded, and although the death of few trees may follow this drastic method, the Curator considers that the greater yield obtained when prices are high fully compensates for this loss. He also suggests that in Seychelles it may be better to tap by this method for three months during the rainy season, when young trees can withstand the effects of serious wounds, than to employ any other method which would necessitate extending the tapping period into the dry season to obtain the same quantity of rubber.

Five-and-six-years-old trees were in one instance tapped by the full spiral method for five or six months, without any apparent check to the growth of the trees or to the fulfilment of their natural functions.

The following table shows the daily yield of latex obtained in one experiment designed to compare the two methods.

	Half-herring-bone Method.			Full Spiral Method.		
Girth of tree at 3 ft. from ground	18 ins.	18 ins.	16 ins.	18 in.	18 in.	16 in.
Date	16.3.11	17.3.11	16.3.11	16.3.11	17.3.11	16.3.11
Latex collected	660 cc.	730 cc.	515 cc.	1075cc.	1045cc	650 cc.
Number of trees	41	41	60	34	34	60
Latex per tree	16 cc.	18 cc.	8 cc.	32 cc.	31 cc.	10 cc.

The latex was coagulated with acetic acid, ammonia solution having been previously added to prevent coagulation on the cuts and in the collecting cups. One cubic centimetre of glacial acetic acid diluted with 250 cubic centimetres of water, was used to each litre of diluted latex.

The rubber was dried slowly in a cool chamber and exported in biscuit form. The slow drying tends to induce the growth of mould, and to prevent this, steps are being taken to effect the drying in a special drying room, after using a smoking machine.

Experiments carried out on a small estate near the Botanic Station serve to indicate to what extent and in what time a Para rubber estate comes into bearing in the hilly districts of Seychelles The estate in question contains 1,800 trees planted in 1905 and 600 trees planted in 1907 and 1908. The soil is rocky and inferior, the trees overcrowded and irregularly planted 10 or 12 feet apart; yet in spite of these adverse conditions about 10 per cent. of the five-year-old trees have reached tappable size, 16 in. and over in girth at 3 feet from the ground. On marshy land about 50 per cent. reach tappable size in five years. The average yield of latex, on the twenty-third day of tapping, from trees 18 in. in girth was 16 cc. per tree by the half-herring-bone method and 24 cc. by the full spiral method The best tree, 23 in. in girth, yielded nearly 100 cc. of latex daily during forty-two days, and this large yield had not decreased at the time the report was drawn up.

No fungoid disease has yet appeared on the Hevea in Seychelles, but as several diseases of other plants, which have spread to Hevea in Ceylon and other countries are present, precautions are being taken against infection.

An attempt was made to introduce rubber stumps from Ceylon, but the experiment was not very successful. The proportion of plants raised from stumps in two consignments received was 30 per cent. and 50 per cent. respectively. The number of plants raised from local seeds is steadily increasing, and it is anticipated that in two or three years it will be unnecessary to import Hevea seed for planting purposes

A NEW COCONUT PEST.

Yet another pest of the Coconut has been discovered in the Philippines and from all accounts it will prove a serious menace to plantations in the Colony and Federated Malay States unless sufficient precautions are taken immediately. So far, it seems to be restricted to certain areas in the Philippines, and the Department of Agriculture are fully aware of the danger arising from this insect, and we may be sure that they will use every means in their power, to prevent its spreading throughout the Philippines and ultimately to the Straits Settlements.

It has been considered advisable to prohibit the importation of palms, etc., from the Philippines.

We reprint the description, etc., of this pest as it has appeared in The Philippine Agricultural Review, together with the copy of the Ordinance as it appeared in the S. S. Gazette, May 31st, 1912.

"A parasite of the coconut palm, which may prove to be the most serious pest of this crop in the Philippine Islands, was discovered in May, 1911. This insect is related to the White Fly of the citrus orchards of Florida, and this fact alone is sufficient to cause the coconut planters considerable anxiety. For the present, however, it appears that this insect, which may be termed the Coconut White Fly, is confined to a district in Negros Oriental, extending from the barrio of Tabon on the north and the barrio of Zamora on the south, range of some 35 kilometers in length. Most of the coconut groves in this area, which extends from the sea-coast back to a range of hills to the west, are infested with the parasite.

The first specimens were collected on the hacienda of Mr. Henry Gardner in the vicinity of Guijulgant. It appears that this is the first occurence of any insect of this genus in the Philippine Islands, and, further more, the species itself is new to science. It has been described by Mr. Quainstance of the Bureau of Entomology, United States Department of Agriculture, D. C., as *Aleyrodicus destructo* a similar species (*A. cocois*, Westw.) occurs in the West Indies and has caused immense damage there to the coconut groves, some districts having even been abandoned largely on account of it attacks.

Like all of the so-called "White Flies" (which are, of course, not flies) and the related "scales," the individuals are very small and not readily noticeable except when present in large colonies. The general color of the older individuals is white or grayish; at first the larvae are nearly naked and of a pale brownish shade, but when about half grown they develop a fringe of white waxy material around the edge of the body. This waxy substance, as the insect grows, gradually covers the entrie body with a mass of cottony thread-like appendages and waxy flakes.

The minute eggs are laid on the under surface of the leaflets, usually on the young leaves of the palm. Thus far it appears the insect is attacking by preference only the young palms, that is, those under 6 or 8 years of age, but unless checked it will probably soon spread to all the palms in the vicinity.

Soon after the eggs are hatched the young insect begins walking about on the underside of the leaf in the endeavour to find a suitable position for its attack, satisfying itself as to location, it inserts its beak through the epidermis of the leaf and begins to suck the sap from the soft inside tissue; after becoming thus attached, the young insect seldom moves, unless disturbed, until it attains its full size. Shortly before emerging as a winged insect it stops feeding, but remains attached to the leaf. Though comparatively weak fliers, the danger of their passing through the air from one tree to another is greatly increased by the action of winds, since when the insect may only wish to fly from one leaf to another, it may be accidently borne by the wind to a considerable distance.

Some of the colonies contain scarcely more than a dozen individuals, while others contain many thousands and form an irregular white area over the underside of the leaf. This feature of their colour is exceedingly valuable to the coconut planter, since it allows him to readily determine the presence of a colony in his grove.

Although a hymenopterous insect, evidently a parasite of this coconut pest, was observed in the act of laying eggs in or upon the immature White Flies, it is not likely that any natural parasites will be of much avail in checking the spread of this pest. Therefore the coconut planters in the infested district should immediately go through their groves, cutting off and burning all attacked leaves, or portion thereof, and by the same token, it would be well for all coconut planters to carefully look over their young groves, and if any white insects are discovered, they should report the fact at once to the Director of Agriculture and should remove and burn all traces of the parasite. In certain cases it might be advisable to treat the pest with kerosine emulsion, or some similar spray, but unless the grower has had experience with such remedies, the use thereof would probably be in vain, if not actually injurious to the tree itself. Fumigation could be recommended only for extreme cases and then only for young trees.

If this pest is taken in hand immediately, there is very little chance of its spreading to other districts of the Philippines; and it is earnestly hoped that coconut planters throughout the Visayas and Tayabas will make a strenuous effort to prevent the spread of this pest, which, although apparently new to these Islands may within a few years become an exceedingly important factor in the coconut industry of the Far East.

(By D. B. Mackie, in *The Philippine Agricultural Review*, Vol. V. p. 142)

"Whereas it is provided by "The Destructive Pests Ordinance 1908" that the Governor in Council may from time to time make such Orders as may to the Governor in Council appear expedient for preventing the introduction into the Colony of any insect, fungus or other pest destructive to agricultural or horticultural crops, or to trees, or plants and for preventing the spreading in the Colony of any such insect, fungus, or other pest"

"AND WHEREAS information has been received to the effect that a disease of the coconut palm, believed to be the disease known as "WHITE FLY" (Aleyrodicus destructor) has apppeared among coconuts in the Philippines Islands."

"NOW, THEREFORE the Governor in Council in exercise of the powers conferred on him by the aforesaid Ordinance prohibits until further notice the landing in the Colony of any palms, alive or dead, or any stems or foots or parts of stems or roots of palms or of any products of palms other than such as are expressly exempted from the operation of this Order, from the Philippine Islands, and authorizes the destruction of any such article, if landed in the Colony from the Philippine Island. This Order does not apply to dried copra or to oil expressed from coconuts."

(Sd.) M. S. H. McArthur,
Clerk of Councils.

Council Chamber,
Singapore, 28th May, 1912.

THE CASTOR OIL PLANT.

Having received enquiries from Planters as to the suitability or otherwise of the Castor Oil Plant as a "Catch Crop" for Rubber, it may be helpful to others with like ideas, if a few of the details of this plant are enumerated for their guidance.

The Castor Plant (*Ricinus communis*) is probably well known to many Planters in the Peninsula, as scattered plants are generally to be found growing round Tamil Coolie Lines, the coolies sowing a few seeds in order to obtain the oil from the plants thus sown.

Belonging to the Natural Order Euphorbiaceae, it is thus related *Hevea brasiliensis* and many other plants yielding valuable oil seeds. It is generally believed to have been originally a native of North Africa, but the plant is now largely cultivated throughout the world, in Tropical and sub-tropical and occasionally in Temperate regions.

It is said to occasionally attain a height of from 20 to 30 feet, but it rarely if ever attains a larger size than from 5 to 7 feet in the Peninsula.

As a purely decorative plant it appeals to many and is largely cultivated in temperate countries for this quality alone, but the chief product derived from this plant, as perhaps every one knows, is the valuable oil obtained from the seeds.

There are many varieties of this plant—the seeds varying in size and shape, but for all practical purposes, the numerous forms may be grouped into two classes, *i.e.*, the large-seeded and small-seeded kinds. The former are more prolific in yield of seeds and the oil obtained from them is largely used as a lubricating oil, and in India it is used as an illuminant and is commercially called " Lamp Oil ". The latter, *i.e.*, the small seeded kinds, yield a much finer oil and this is preferred for use in medicine.

The soil best suited to the Castor Plant is, a rich well-drained sandy or clayey loam. Owing to its well developed root system the Castor plant demands a deep rooting medium. The Castor plant soon exhausts the soil and if virgin land is not available for the crop, natural or artificial manures are necessary. It will be readily seen that round coolie lines is an ideal situation for this plant, in so far as food is concerned as decaying matter of all kinds is ever to be found in such places.

One of the most valuable manures for this plant is the residual cake left after the expression of the oil from the seeds.

In the tropics the cultivation of this plant seems to be restricted by excessive rainfall, while in Malaya it is attacked and often denuded of leaves by a Caterpillar (Ophiusa sp.).

Before sowing the seeds it is advisable to steep them in slightly warmed water for about 24 hours. This treatment soften the hard seed coat and tends to ensure quick and uniform germination. The large seeded kinds are generally planted in rows from 5 to 5 feet apart with a similar distance between the plants in the row. The small seeded kinds are planted closer, *i.e.*, about 3 feet between the rows and 18 inches from plant to plant. It is advisable, to secure an event crop, that 2 or 3 seeds be planted at the distance mentioned above.

After germination, the weaklings one be removed and the strongest one in each case allowed to continue its growth.

In India the Castor Plant is seldom grown as a pure crop, it being usually interplanted with cereals or some leguminous crop. It is often planted as a border to cotton or sugar fields, when planted as a pure crop, about 10 lbs. of seeds of the large seeded varieties are required to plant an acre and about 14 lbs. in the case of the small seeded kinds.

After thinning, it is advisable to slightly mould up the plants by drawing the soil up round the stem, this preventing moisture from collecting at the base.

The capsules of the small seeded varieties commence to ripen in from 4 to 6 months from the time of sowing and those of the large seeded varieties from 7 to 10 months according to variety and the prevailing climate conditions. Owing to the irregular ripening of this crop, the harvesting is a somewhat tedious process, but as the work involved is not laborious, it could be done by women and children.

As the capsule dehisces and scatters the seed immediately they are ripe, it is necessary to look over the plants at least once a week, collecting those sufficiently ripened. The seeds after collecting require drying and may then be stored in bags in a dry place until sold or pressed for oil.

The average yield per acre (pure crop) is given as 4 to 6 cwt. of seeds average good crop.

From the foregoing it would seem that it is not altogether a suitable Catch Crop for rubber owing to its habit of exhausting the soil. When practical, however, this plant could be planted as a border to rubber, but this is largely a question of the quality of soil in individual Estates.

J. W. A.

MR. H. A. WICKHAM COMING OUT TO CEYLON WITH A CURING MACHINE.

The father of the plantation rubber industry, Mr. H. A. Wickham, is due in Colombo towards the end of the month, the chief purpose of his visit being to introduce a machine which embodies his ideas, acquired in the home of Hard Fine Para, as to the curing of rubber. Mr. Wickham has every hope that his machine will have a great effect upon the plantation rubber industry. During his stay in England, Mr. Wickham has been making arrangements with regard to the machine, but owing to the time it has taken to settle matters, has been delayed longer than he expected, otherwise he would have been in the Island now.

We understand that Mr. Wickham claims that his machine imitates the well-known smoking process employed by the natives on the Amazon, each layer of rubber being smoked and the article consequently thoroughly permeated by the disinfectant fumes. It is Mr. Wickham's contention that under the present processes some of the best qualities of the rubber are lost, carried away in the washing, and it will be interesting to watch how far he will be able to substantiate his claim by the production of samples of superior resiliency and tensile strength than the present first quality rubber turned out on estates. It is also claimed that the machine will turn out a perfectly uniform quality, whereas at present the rubber from the same estate varies considerably. *(Times of Ceylon 6th June, 1912).*

CLEARING WITH EXPLOSIVES.

The Value of Explosives in Clearing.

It will be found that the chief uses to which explosives can be put with economy in clearing land, are in the removal of stumps, and in so shattering logs or standing trees that they burn more readily. Trees can be blown right out of the ground; but, owing to their greater weight they take more explosive than stumps. I therefore consider it more economical to put sufficient explosive under them to blow the earth out from around the roots, at the same time cracking and breaking the roots and butt of the tree. The cracks will extend from 4 to 15 feet up the trunk of the tree; and after a week's exposure to the air in dry weather, even bad burning timber will then burn readily. I have burnt down trees 7 feet in diameter at the ground in six to twenty four hours having used 5s. worth of explosive on some. These trees would have taken a week to burn down in the ordinary way, that is, digging the earth away from them, and drawing timber around them with horses or bullocks.

The economy of the method will be realised when I state that I have cleared 12 acres of land at a cost of £3 per acre, whereas an adjoining block of similar land cost me about £6 per acre to clear in the old way. This was on light red volcanic soil, overlying light clayey loam.

The method cannot be recommended in cases where timber burns right out of the ground, leaving no roots. But in this district I have found the saving in cost to vary from 25 to 50 per cent. on the usual methods of grubbing and burning. With practice, much better work can be done at less cost with explosives. The procedure should be varied to suit different timbers and different soils; the exercise of a little judgement will be found profitable.

Sound timber, whether trees, stumps, or logs, will be shattered with better effect than hollow or rotten timber, as it offers more resistance to the explosives.

Condition of the Soil.

To obtain best results I find that the ground requires to be fairly dry. If it is very dry, the explosion is not quite so effective; whilst if it is too wet, the force seems to act too deeply in the earth, instead of near and above the surface. In some districts, I am informed, best results are obtained when the ground is wet; but that is not my experience and I do not know to what degree it holds good.

Explosives Recommended.

For firing, a battery *guaranteed* to fire five or more shots is absolutely necessary for best results. It is possible to work in small timber with fuse and caps, but the method is not so satisfactory as the use of a battery.

The explosives which I have used are rackarock and rendrock. I consider the latter the better for earth holes, as it seems to take more roots with the stump; but I can recommend both. I have used a little gelignite, and it seems very good; I intend to give it further trials. Other explosives are worthy of trials, but I should not advise farmers to use dynamite, as it is more subject to chemical changes, particularly in hot climates.

If rackarock is used, insert the detonator in half a plug of gelignite for earth holes. Much better combustion will result if this is done.

Bursting the Timber.

When it is desired to burn trees or stumps level with the ground, or to burn sound logs, bore holes 1 to 2 feet deep into the soundest part of the timber, with 1 inch to 1½ inch auger, and charge same with ½ lb. to 1 lb. of explosive. A number of shots fired simultaneously with the battery will do very much better work than when they are fired singly with fuse. This method is suitable for Yankee grubbing, as it uses less explosive; but is not as good as the next method for getting rid of trees and stumps.

Clearing for the Plough.

To remove trees and stumps for the plough, put holes under the heaviest and soundest parts of same, 12 inches or more in depth, with a 3-inch earth auger or small bar and scraper. When placing the charges, take into consideration the lay of the main spur roots. Best results are obtained by using three charges or more according to the size of the tree. Place each charge up against a big strong root, or better still in the fork of two roots. If it is not easy to get the charge against a root, ram small stones into the bottom of the hole, so as to make a sound bottom for the charge, as the more resistance obtained the better the results of the explosion. Do this before any explosive is put in the hole, or there would be great danger.

In some cases it is better to use both earth and wood holes, placing the latter in big spur roots; but I rarely do so, as it snaps the roots and leaves portion in the ground.

The charges should be carefully tamped with damp clay or earth observing the proper rules, as there is considerable danger if they are neglected. Water tamping is not at all effective in wood, though it is in rock.

In earth holes I find 1 lb. of explosive about the minimum effective charge for large trees and stumps; but I have blown out small stumps with as little as ¼ lb. With well-placed charges stumps frequently come out, shattered into many pieces, leaving few if any roots. When any remain they are so shattered that they burn easily.

A Warning.

A beginner will require 50 lbs. of explosive to give the method a thorough trial. He should start on medium-sized sound stumps, as they are easier to operate on. Necessary case should be observed when handling explosives, and he should be extremely careful of the detonators. He should also bear in mind that large bits of wood will sometimes fly 150 yards. Detonators should never be *stored and kept* with explosives in the same receptacle.

(*H. B. Faviell, Bonville, in the Agricultural Gazette of New South Wales, May 2, 1912.*)

NOTICE.

A CATALOGUE of all the plants in the Botanic Gardens, Singapore, has been compiled and is ready for issue.

It contains plants of Economic, Decorative and Botanical Interest. Copies may be obtained direct from the Botanic Gardens or from Messrs. Kelly & Walsh, Singapore, post free on receipt of one dollar.

Early application is essential as only a limited number of copies have been printed.

EXPORTS TELEGRAM TO EUROPE AND AMERICA.

Month of April.

		Steamers.		Wired. Apl. 15. Tons.	Apl. 30. Tons.
Tin	Str. Singapore & Penang	to U. Kingdom &/or		725	1,758
Do.	do.	U. S. A.		380	825
Do.	do.	Continent		120	427
Gambier	Singapore	Glasgow		...	...
Do.	do.	London		...	25
Do.	do.	Liverpool		10	...
Do.	do.	U. K. &/or Continent		...	50
Cube Gambier	do.	United Kingdom		5	10
Black Pepper	do.	do.		...	5
Do.	Penang	do.		...	10
White Pepper	Singapore	do.		40	10
Do.	Penang	do.		...	...
Pearl Sago	Singapore	do.		10	40
Sago Flour	do.	London		100	375
Do.	do.	Liverpool		1,200	160
Do.	do.	Glasgow		50	75
Tapioca Flake	Singapore	United Kingdom		75	10
Tapioca Pearl & Bullet	do.	do.		150	120
Para Rubber	Straits & Malaya	do.		550	800
Gutta Percha	Singapore	do.		60	95
Buffalo hides	do.	do.		110	60
Pineapples	do.	do.		17,500	17,500
Gambier	do.	U. S. A.		140	175
Cube Gambier	do.	do.		40	110
Black Pepper	do.	do.		160	45
Do.	Penang	do.		...	...
White Pepper	Singapore	do.		80	25
Do.	Penang	do.		...	15
Tapioca Pearl	Singapore	do.		...	...
Nutmegs	Singapore & Penang	do.		9	27
Sago Flour	Singapore	do.		550	650
Pineapples	do.	do.		4,500	2,750
Do.	do.	Continent		1,500	2,750
Gambier	do.	South Continent		50	75
Do.	do.	North Continent		125	190
Cube Gambier	do.	Continent		45	10
Black Pepper	do.	South Continent		60	95
Do.	do.	North	do.	...	...
Do.	Penang	South	do.	...	...
Do.	do.	North	do.	...	...
White Pepper	Singapore	South	do.	10	...
Do.	do.	North	do.	...	...
Do.	Penang	South	do.	5	10
Do.	do.	North	do.	...	...

			Wired. Apl. 15. Tons.	Apl. 30. Tons.
	STEAMERS.			
Copra	Singapore & Penang	Marseilles	500	400
Do.	do.	Odessa	780	780
Do.	do.	Other South Continent	100	240
Do.	do.	North Continent	480	1,700
Sago Flour	Singapore	Continent	1,500	1,100
Tapioca Flake	do.	do.	75	35
Do. Pearl	do.	do.	10	30
Do. Flake	do.	U. S. A.	...	...
Do. do.	Penang	U. K.	...	...
Do. Pearl & Bullet	do.	do.	80	50
Do. Flake	do.	U. S. A.	...	...
Do. Pearl	do.	do.	10	420
Do. Flake	do.	Continent	...	...
Do. Pearl	do.	do.	180	25
Copra	Singapore & Penang	England	50	...
Gutta Percha	Singapore	Continent	5	35
Para Rubber	Straits and Malaya	U. S. A.	85	40
Do.	do.	Continent	45	55
Tons Gambier „ B. Pepper	... ...	...	400 150	700 320

Month of May.

			Wired. May. 15. Tons.	May. 31 Tons.
	STEAMERS.			
Tin	Str. Singapore & Penang	to U. Kingdom &/or	1,840	1893
Do.	do.	U. S. A.	645	960
Do.	do.	Continent	120	295
Gambier	Singapore	Glasgow	...	...
Do.	do.	London	60	...
Do.	do.	Liverpool	70	...
Do.	do.	U. K. &/or Continent	...	...
Cube Gambier	do.	United Kingdom	10	15
Black Pepper	do.	do.	...	...
Do.	Penang	do.	...	...
White Pepper	Singapore	do.	...	10
Do.	Penang	do.	...	...
Pearl Sago	Singapore	do.	10	5
Sago Flour	do.	London	175	200
Do.	do.	Liverpool	1,400	...
Do.	do.	Glasgow	...	100
Tapioca Flake	Singapore	United Kingdom	35	170
Tapioca Pearl & Bullet	do.	do.	160	80
Para Rubber	Straits & Malaya	do.	525	540
Gutta Percha	Singapore	do.	20	75
Buffalo hides	do.	do.	100	50
Pineapples	do.	do.	25,000	16,250

		Steamers.		Wired. May 15. Tons.	Wired. May 31. Tons.
Gambier	United Kingdon	U. S. A.		25	450
Cube Gambier	do.	do.		...	50
Black Pepper	do	do.		30	230
Do.	Penang	do.		...	55
White Pepper	Singapore	do.		5	50
Do.	Penang	do.		...	45
Tapioca Pearl	Singapore	do.		...	30
Nutmegs	Singapore & Penang	do.		6	40
Sago Flour	Singapore	do.		...	400
Pineapples	do.	do.		2,250	7,500
Do.	do.	Continent		1,500	2,250
Gambier	do.	South Continent		100	...
Do.	do.	North Continent		325	210
Cube Gambier	do.	Continent		15	40
Black Pepper	do.	South Continent		75	190
Do.	do.	North	do.	...	...
Do.	Penang	South	do.	...	15
Do.	do.	North	do.	...	...
White Pepper	Singapore	South	do.	10	5
Do.	do.	North	do.	5	...
Do.	Penang	South	do.	...	...
Do.	do.	North	do.	...	...
Copra	Singapore & Penang	Marseilles		100	50
Do.	do.	Odessa		...	900
Do.	do.	Other South Continent		100	150
Do.	do.	North Continent		3,100	2,200
Sago Flour	Singapore	Continent		700	875
Tapioca Flake	do.	do.		60	55
Do. Pearl	do.	do.		...	20
Do. Flake	do.	U. S. A.		...	...
Do. do.	Penang	U. K.		...	100
Do. Pearl & Bullet	do.	do.		85	225
Do. Flake	do.	U. S. A.		...	...
Do. Pearl	do.	do.		120	550
Do. Flake	do.	Continent		...	...
Do. Pearl	do.	do.		370	85
Copra	Singapore & Penang	England		100	150
Gutta Percha	Singapore	Continent		40	35
Tons Gambier „ B. Pepper	... ...	...		700 340	700 225
Para Rubber	Straits & Malaya	U. S. A.		30	85
Do.	do.	Continent		55	25

SINGAPORE MARKET REPORT.

April, 1912.

	Tons.	Highest	Lowest.
Copra	3,736	11.20	10.60
Gambier Bale	1,126	10.45	10.00
„ Cube No. 1 & 2 ...	169	16.00	13.62½
Gutta Percha 1st quality ...	...	275.00	200.00
„ medium ...	...	140.00	90.00
„ lower ...	...	70.00	17.00
Gutta Jelotong	...	11.60	9 25
Nutmegs 110s.	...	25.00	23 00
„ 80s.	...	27.00	25.00
Black Pepper	518	22.12½	20.75
White „	119	32.50	30.50
Sago Pearl, small	...	6.00	5.30
„ Flour No. 1	3,179	4.75	4.35
„ „ No. 2	251	1.70	1.60
Tapioca Flake, small ...	186	9.40	8.90
„ Pearl „ ...	140	9.00	7.80
„ „ medium ...	178	9.40	9.00
Tin	1,950	100.62½	95.37½

May, 1912.

	Tons.	Highest.	Lowest.
Coffee Bali	10	...	...
Copra	4,752	11.80	10.50
Gambier Bale	1,465	10.20	9.85
„ Cube No. 1 & 2 ...	307	15.85	13.60
Gutta Percha 1st quality ...	...	275.00	200.00
„ medium ...	...	140.00	90.00
„ lowest ...	...	70.00	17.00
Gutta Jelotong	...	11.25	8.50
Nutmegs 110s.	...	25.00	...
„ 80s.	...	27.00	...
Black Pepper	468	22.00	21.12½
White „	144	33.00	31.00
Sago Pearl, small	25	6.75	5.75
„ Flour No. 1	4,403	5.07½	4.40
„ „ „ 2	...	2.10	2.00
Tapioca Flake, small ...	684	9.70	8.90
„ Pearl „ ...	199	8.50	7.90
„ „ medium ...	221	9.85	9.00
Tin	2,295	105.00	100.75

PENANG.

Abstract of Meteorological Readings in District Hospital, Penang, for the month of April, 1912.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
												Ins.	Ins.
PENANG.	29.812	15.5	85	95	72	not recorded.	82.4	.895	74.8	73.2	not recorded.	5.48	79

Senior Medical Officer's Office,
Penang, 30th May, 1912.

B. Dane.
Senior Medical Officer, Penang.

NEGRI SEMBILAN.

Abstract of Metcorological Readings in the various Districts of the State of Negri Sembilan for the month of April, 1912.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
District Hospital, Seremban	...	153.9	82.4	91.5	73.5	18.0	76.9	.821	73.2	74	N	2.60	1.60
„ „ Mantin	...	...	...	...	...	...	...	...	...	...	...	4.97	1.82
„ „ Tampin	...	150.6	83.1	90.2	75.3	14.9	76.7	.805	72.8	71	...	2.41	1.64
„ „ Kuala Pilah	...	...	82.6	91.3	74.3	17.0	77.7	.855	74.3	77	...	5.78	2.31
„ „ Jelebu	...	...	...	...	...	...	...	...	...	...	...	2.24	1.42
„ „ Port Dickson	...	164.0	84.4	90.3	75.5	14.8	78.3	8.52	74.4	72	...	2.19	0.71
Beri-beri Hospital „ „	...	...	...	...	...	...	...	...	...	...	...	1.77	0,90

OFFICE OF THE SENIOR MEDICAL OFFICER,
KUALA LUMPUR, 28th May, 1912.

G. D. FREER.
Senior Medical Officer,
Selangor, Negri Sembilan & Pahang.

KELANTAN.

Abstract of Meteorological Readings in Kelantan for the Month of April, 1912.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Mean Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Mean Maximum.	Mean Minimum.	Mean Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	%		Ins	Ins.
Kota Bharu	...	142.0	82.2	88.4	75.0	13.4	79.2	.927	77.0	84.8	...	4.04	1.38
Kuala Lebir	...	...	80.6	92.6	74.6	18.0	77.3	.871	75.1	83 5	...	4.21	1.60
Kuala Kelantan	...	...	...	86.43	74.20	12.23	...	...	...	...	...	2.09	0.76
Kuala Pahi	...	...	...	88.80	73.76	15.04	...	.	...	...	...	3.09	1.06
Kuala Val	...	...	...	89 00	74.76	14.23	...	...	...	...	...	1.96	1.20
Chaning Estate	...	...	...	91.00	74.00	17.00	...	...	...	...	...	3.63	1.03
Pasir Jinggi	...	...	...	...	...	...	...	...	...	...	...	2.68	.72
Semerah Estate	...	...	...	...	...	...	...	...	...	...	...	2 77	.50
Toko Ayer Merah	...	...	...	...	...	...	...	...	...	...	...	2.34	.50
Pasir Gajah Estate	...	...	...	...	...	...	...	...	...	...	...	1.05	0.70
Taku Plantation	...	...	...	...	...	...	...	...	...	...	...	1.61	1.09
Pasir Besar	...	...	...	...	...	...	...	...	...	...	...	1.94	1.25
Kenneth Estate	...	...	...	...	...	...	...	...	...	...	...	31	.23

JOHN. D. GIMLETTE,
Residency Surgeon, Kelantan.

RESIDENCY SURGEON'S OFFICE,
KOTA BHARU, 18th May, 1912.

PERAK.

Abstract of Meteorological Readings in the various Districts of the State of Perak, for the month of April, 1912.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Taiping	...	106	83.18	93	71	22	78.43	909	...	81	...	14.50	2.67
Kuala Kangsar	...	...	82.52	95	71	24	77.19	862	...	79	...	11.18	3.42
Batu Gajah	...	...	83.46	95	70	25	78.27	898	...	79	...	15.80	4.15
Gopeng	...	...	82.05	94	70	24	76.42	836	...	77	...	13.31	3.46
Ipoh	...	...	83.37	95	72	23	77.88	882	...	79	...	10.77	3.41
Kampar	...	...	82.46	94	68	26	77.54	879	...	81	...	13.16	4.72
Telok Anson	...	...	82.21	94	69	25	77.96	900	...	88	...	7.94	1.55
Tapah	...	...	82.75	93	68	25	77.61	879	...	79	...	21.59	3.22
Parit Buntar	...	...	83.93	92	73	19	78.62	908	...	79	...	4.23	1.25
Bagan Serai	...	...	83.66	92	72	20	79.16	935	...	81	...	7.33	2.18
Selama	...	...	82.64	94	71	23	78.52	920	...	83	...	19.19	3.62
Lenggong	...	...	82.69	94	63	31	77.30	868	...	79	...	5.48	1.75
Tanjong Malim	...	...	82.43	95	68	27	78.34	915	...	83	...	13.68	2.58
Grit	...	...	82.25	96	68	28	76.02	816	...	75	...	11.02	2.37
Klian Intan	...	...	...	...	...	...	...	...	...	...	...	3.97	1.68
Pulau Bangkor Laut	...	...	...	...	...	...	...	...	...	...	...	5.45	1.74
Kuala Kurau	...	...	...	...	...	...	...	...	...	...	...	6.07	2.95
The Cottage	...	...	...	...	...	...	...	...	...	...	...	12.54	4.60
Maxwell's Hill	...	...	...	...	...	...	...	...	...	...	...	9.39	2.05

OFFICE OF THE SENIOR MEDICAL OFFCER,
TAIPING, 14th May, 1912.

S. C. G. FOX.
Senior Medical Officer.

PERAK.

Abstract of Meteorological Readings in the various Districts of the State of Perak for the month of May, 1912.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Taiping	...	106	81.88	92	72	20	77.96	905	...	85	...	25.22	5.34
Kuala Kangsar	...	...	81.14	93	73	20	77.26	885	...	85	...	8.87	2.15
Batu Gajah	...	111	81.88	92	73	19	77.86	899	...	88	...	11.20	2.75
Gopeng	...	...	80.75	91	70	21	76.36	851	...	82	...	22.53	4.74
Ipoh	...	...	81.81	92	72	20	77.56	888	...	88	...	12.65	2.00
Kampar	...	...	81.78	92	71	21	77.76	896	...	88	...	18.56	2.50
Telok Anson	...	...	81.40	93	69	24	77.59	894	...	85	...	11.15	1.88
Tapah	...	...	81.27	92	70	22	77.41	891	...	85	...	25.50	3.10
Parit Buntar	...	...	82.62	92	72	20	78.06	899	...	81	...	9.49	2.03
Bagan Serai	...	...	82.64	91	72	19	78.69	927	...	85	...	19.73	3.87
Selama	...	...	82.01	92	72	20	78.58	931	...	87	...	23.17	5.52
Lenggong	...	...	81.32	93	73	20	77.88	887	...	85	...	8.83	2.33
Tanjong Malim	...	...	81.09	93	68	25	78.30	934	...	89	...	17.80	3.62
Grit	...	...	80.67	94	72	22	76.66	863	...	82	...	11.03	1.16
Klian Intan	...	...	...	...	...	...	...	...	...	...	...	5.09	.72
Pulau Pangkor Laut	...	...	...	...	...	...	...	...	...	...	...	10.10	1.82
Kuala Kurau	...	...	...	...	...	...	...	...	...	...	...	16.25	3.10
The Cottage	...	...	...	...	...	...	...	...	...	...	...	27.75	4.38
Maxwell's Hill	...	...	...	...	...	...	...	...	...	...	...	24.04	5.10

OFFICE OF THE SENIOR MEDICAL OFFICER,
TAIPING, 14th June, 1912.

S. C. G. FOX.
Senior Medical Officer.

SELANGOR.

Abstract of Meteorological Readings in the various Districts of the State of Selangor, for the month of April, 1912.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Dry Bulb.	Vapour Tension.	Dew Point.	Humidity.			
General Hospital, Kuala Lumpur ...	29.884	148.5	83.2	92.2	74.3	17.9	77.6	0.845	74.2	74	Calm.	10.76	3.60
Prisons ,, ,, ...	...	...	...	...	...	...	...	...	...	...	...	10.48	3.62
District Hospital ,, ...	...	...	...	...	...	...	...	...	...	...	...	12.07	3.22
,, Klang	...	...	...	94.1	71.3	22.8	...	...	...	...	...	6.27	1.90
,, Kuala Langat ...	...	...	...	92.3	75.5	16.7	...	...	...	...	...	3.43	.90
,, Kajang	...	...	...	89.9	76.9	13.0	...	...	...	...	...	5.96	1.78
,, Kuala Selangor ...	...	...	...	91.0	72.7	18.3	...	...	...	...	...	3.77	0.80
,, Kuala Kubu	...	...	...	94.1	71.6	22.5	...	...	...	...	...	8.19	1.50
,, Serendah	...	...	...	93.2	70.6	22.6	...	...	...	...	...	10.26	1.75
,, Rawang	...	...	...	92.4	71.8	20.6	...	...	...	...	...	15.54	3.30
Sabah Bernam	...	...	...	...	...	...	...	...	...	...	...	7.65	2.10

OFFICE OF THE SENIOR MEDICAL OFFICER,
KUALA LUMPUR, 28th May, 1912.

G. D. FREER,
Senior Medical Officer,
Selangor, Negri Sembilan & Pahang.

MALACCA.

Abstract of Meteorological Readings in Malacca, for the month of April, 1912.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	TEMPERATURE.				HYGROMETER.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
												Ins.	Ins.
Durian Daun Hospital	29.901	156.6	83.5	89.6	73.6	16.0	79.5	.919	...	83	N.	5.85	2.60 on 29th

MALACCA, 22nd May, 1912.

E. W. DE CRUZ,
Assistant Surgeon.

PAHANG.

Abstract of Meteorological Readings in the various Districts of the State of Pahang, for the month of April, 1912.

DISTRICT.	Mean Barometrical Pressure at 32° F.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing direction of winds.	Total rainfall.	Greatest rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
District Hospital, Kuala Lipis	...	...	81.8	90.9	68.6	22.3	75.9	...	...	...	...	5.39	1.05
,, ,, Raub	...	...	82.4	92.4	71.0	21.4	73.0	...	...	...	...	9.87	1.89
,, ,, Bentong	...	...	82.1	90.9	70.9	20.0	76.3	...	...	...	...	5.55	1.94
,, ,, Pekan	...	...	81.9	88.3	72.8	15.5	77.5	...	...	...	...	7.29	1.95
,, ,, Kuantan	...	...	78.5	90.7	...	...	73.7	...	...	...	...	7.43	2.28
Dispensary, Temerloh	...	...	...	92.9	67.5	25.4	...	...	...	...	...	1.61	0.80
Sungei Lembing	...	...	...	89.2	75.0	14.2	...	...	...	...	...	11.07	3.22
Kuala Tembling	...	...	...	...	...	...	...	...	...	...	...	10.68	3.50

OFFICE OF THE SENIOR MEDICAL OFFICER,
KUALA LUMPUR, 24th May, 1912.

G. D. FREER,
Senior Medical Officer,
Selangor, Negri Sembilan & Pahang.